US006259828B1

(12) **United States Patent**
Crinon et al.

(10) **Patent No.: US 6,259,828 B1**
(45) **Date of Patent: *Jul. 10, 2001**

(54) **SPRITE-BASED VIDEO CODING SYSTEM WITH AUTOMATIC SEGMENTATION INTEGRATED INTO CODING AND SPRITE BUILDING PROCESSES**

(75) Inventors: **Regis J. Crinon; Muhammed Ibrahim Sezan**, both of Vancouver, WA (US)

(73) Assignee: **Sharp Laboratories of America**, Camas, WA (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/493,410**

(22) Filed: **Jan. 28, 2000**

Related U.S. Application Data

(62) Division of application No. 08/999,103, filed on Dec. 29, 1997.
(60) Provisional application No. 60/034,558, filed on Dec. 30, 1996.

(51) **Int. Cl.**[7] **G06K 9/54**
(52) **U.S. Cl.** **382/305**; 382/232; 382/236; 382/276; 382/284; 348/588; 348/584; 348/598; 358/403; 358/450; 707/1; 707/3
(58) **Field of Search** 382/154, 232, 382/284, 305, 236, 240; 348/584, 586, 588, 598; 358/403, 404, 426, 450; 707/1, 3, 10

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,649,032 * 7/1997 Burt et al. 382/284
5,686,956 * 11/1997 Oh et al. 348/19
5,692,063 11/1997 Lee et al. .

(List continued on next page.)

OTHER PUBLICATIONS

Irani, et al "Mosaic Based Representations of Video Sequences and Their Applications", IEEE pp. 605–611, 1995.*
Tannenboum, et al "Evaluation of A Mosaic Based Approach To Video Compression", IEEE, pp. 1213–1215, 1996.*
Dufaux, et al "Background Mosaicking For Low Bit Rate Video Coding", IEEE, pp. 673–676, Sep. 1996.*
Song, et al. "Personal Identification by Image–Processing Sequential Images of Human Face", IEEE, pp. 963–967, 1994.*
Video Compression Using Mosaic Representations by M. Irani, S. Hsu and P. Anandan, Signal Processing Image Communication, Nov. 1995, No. 4/6.

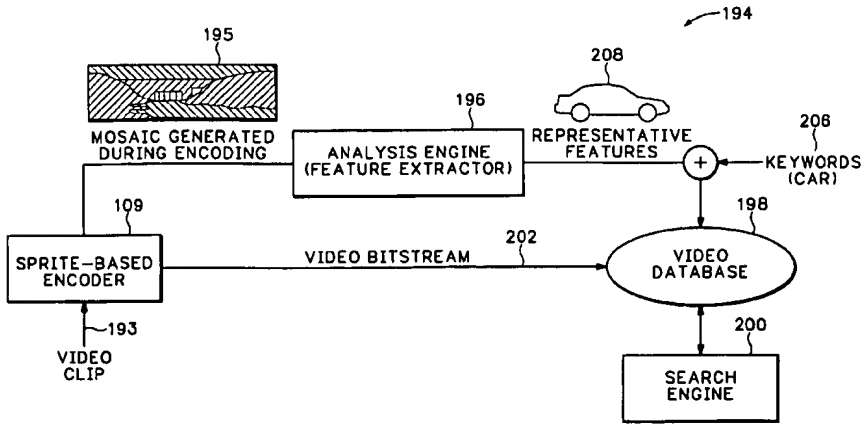
(List continued on next page.)

Primary Examiner—Leo Boudreau
Assistant Examiner—Daniel G. Mariam
(74) *Attorney, Agent, or Firm*—Marger Johnson & McCollom, PC; Stephen S. Ford

(57) **ABSTRACT**

A sprite-based coding system includes an encoder and decoder where sprite-building is automatic and segmentation of the sprite object is automatic and integrated into the sprite building as well as the coding process. The sprite object is distinguished from the rest of the video objects on basis of its motion. The sprite object moves according to the dominant component of the scene motion, which is usually due to camera motion or zoom. Hence, the sprite-based coding system utilizes dominant motion, to distinguish background images from foreground images. The sprite-based coding system is easily integrated into a video object-based coding framework such as MPEG-4, where shape and texture of individual video objects are coded separately. The automatic segmentation integrated in the sprite-based coding system identifies the shape and texture of the sprite object

8 Claims, 11 Drawing Sheets



U.S. PATENT DOCUMENTS

5,778,098	*	7/1998	Lee et al.	382/236
5,782,642	*	7/1998	Goren	434/307 R
5,896,176	*	4/1999	Das et al.	348/416
5,943,445	*	8/1999	Dufaux	382/236
5,956,026	*	9/1999	Ratakonda	345/328
5,956,716	*	9/1999	Kenner et al.	707/10
5,963,664	*	10/1999	Kumar	382/154
5,991,444	*	11/1999	Burt et al.	382/232
5,999,662	*	12/1999	Burt et al.	382/284

OTHER PUBLICATIONS

Image Mosaicing for Tele–Reality Applications by R. Szeliski, Proceedings of the Second IEEE Workshop on Applications of Computer Vision, Dec. 5–7, 1994, pp. 44–53.

Representing Moving Images with Layers by J. Wang and E. Adelson, IEEE Transactions on Image Processing, Sep. 1994, vol. 3, No. 5.

* cited by examiner